

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

Paper No. 42

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex Parte NAOKO KIHARA, FUMIHIKO YUASA,
TOHRU USHIROGOUCHI, TSUKASA TADA,
OSAMU SASAKI, TAKUYA NAITO
and SATOSHI SAITO

Appeal No. 1998-2147
Application 08/247,356

HEARD: January 25, 2001

Before, PAK, WALTZ and JEFFREY T. SMITH, *Administrative Patent Judges*.

JEFFREY T. SMITH, *Administrative Patent Judge*.

Decision on appeal under 35 U.S.C. § 134

Applicants appeal the decision of the Primary Examiner finally rejecting claims

28, 29, 36 and 37. We have jurisdiction under 35 U.S.C. § 134.

BACKGROUND

The invention is directed to a chemical amplification photosensitive composition comprising (i) an alkali-soluble polyvinylphenol resin having a softening point of at least 150°C and a weight average molecular weight which is no less than 3,000 and exceeds 8,000 only when the photosensitive composition containing the resin has sufficient photosensitivity and forms a resist pattern which has sufficient resolution, (ii) an acid-decomposable compound and (iii) a compound which generates an acid when exposed to a chemical radiation. Claims 36 and 37 which are representative of the invention are reproduced below:

36. A chemical amplification photosensitive composition, comprising:

an alkali-soluble polyvinylphenol resin having a softening point of at least 150°C and a weight average molecular weight which is no less than 3,000 and exceeds 8,000 only when the photosensitive composition containing the resin has sufficient photosensitivity and forms a resist pattern which has sufficient resolution;

an acid-decomposable compound; and

a compound which generates an acid when exposed to a chemical radiation.

37. A chemical amplification photosensitive composition,
comprising:

an alkali-soluble polyvinylphenol resin having a softening point of
at least 160°C and a weight average molecular weight which is no less
than 3,000 and exceeds 8,000 only when the photosensitive composition
containing the resin has sufficient photosensitivity and forms a resist
pattern which has sufficient resolution;

an acid-decomposable compound; and

a compound which generates an acid when exposed to a chemical
radiation.

As evidence of obviousness, the Examiner relies on the following references:

Nguyen-Kim et al. (Nguyen-Kim)	5,035,979	Jul. 30 , 1991
Uenishi et al. (Uenishi '389) (Filed Apr. 26, 1990)	5,173,389	Dec. 22, 1992
Uenishi et al. (Uenishi '582) (Filed Dec. 8, 1992)	5,248,582	Sept. 28, 1993
Elsaesser et al. (Elsaesser) (Filed Jan. 30, 1991)	5,376,496	Dec. 27, 1994
Crivello et al. (Crivello) European Patent Application	EP 0249139	Dec. 16, 1987

THE REJECTIONS

The Examiner entered the following grounds of rejection:

Claims 28, 29 and 37 are rejected as unpatentable under 35 U.S.C. § 112, second paragraph. (Examiner's Answer, page 5).¹

Claims 28, 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 112, first paragraph. (Examiner's Answer, page 4).

Claims 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Crivello. (Examiner's Answer, page 6).

Claims 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Nguyen-Kim. (Examiner's Answer, page 9).

Claims 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Elsaesser. (Examiner's Answer, page 11).

Claim 28 is rejected as unpatentable under 35 U.S.C. § 103(a) over Crivello, Nguyen-Kim, or Elsaesser in view of Uenishi '389 or Uenishi' 582. (Examiner's Answer, page 14).

¹ The final rejection of claim 35 under 35 U.S.C. § 112, second paragraph, appears to be in error because claim 35 was canceled by Appellants in the amendment submitted June 25, 1997, paper no. 26.

Cited References

Crivello discloses photosensitive compositions comprising a combination of (i) a compound which generates an acid when exposed to activating radiation and (ii) a compound (dissolution inhibitor) which contains acid cleavable groups. (See pages 2-5). The dissolution inhibitor is decomposed by acid liberated from an onium salt, when the composition is exposed to radiation.

Nguyen-Kim discloses photosensitive compositions comprising a combination of (i) a compound which generates an acid when exposed to activating radiation, (ii) a compound (dissolution inhibitor) which contains acid cleavable groups and (iii) a binder. (Column 2, lines 28-56). The dissolution inhibitor compound (ii) ester groups are decomposed by the acid liberated from the compound (i). (Column 5, line 55 to column 6, line 58).

Elsaesser discloses positive photosensitive compositions comprising a combination of (i) a compound which generates an acid when exposed to activating radiation and (ii) a compound (dissolution inhibitor) which contains acid cleavable groups. (Column 2, lines 12-36). The dissolution inhibitor composition is a 1,2-quinone diazide compound and/or a combination of a compound which forms a strong acid when exposed to actinic radiation and a compound containing at least one acid

cleavable C-O-C bond. (Column 5, line 50 to column 6, line 31). Thus, the dissolution inhibitor contains at least one acid-cleavable ether bond which is decomposed by the acid liberated from the acid generating compound.

Uenishi '389 and '582 disclose positive type photosensitive compositions comprising a binder and a photosensitive dissolution inhibitor. The dissolution inhibitor contains a multi-aromatic ring compound, which contains a cyclic ring system constituted of heteroatoms and quinone diazide radicals. ('389, column 2 line 36 to column 8, line 24; '582 column 2, line 34 to column 3, line 68). Uenishi discloses quinone diazide dissolution inhibitor compounds produce an alkali-soluble substance when irradiated with light to undergo decomposition. ('389, column 1 lines 30-35; '582 column 1, lines 50-57). Uenishi does not disclose the presence of a compound which forms an acid upon exposure to radiation or that the dissolution inhibitor contains groups which are cleaved by an acid.

OPINION

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the Examiner and Appellants in support of their respective positions. This review leads us to conclude that only the § 112, first paragraph, rejection is well founded. Accordingly, we will sustain the § 112, first

paragraph, rejection, but will reverse the § 112, second paragraph, § 102 and § 103 rejections. Our reasons for this conclusion follow.

Rejection Under 35 U.S.C. § 112, Second Paragraph

The examiner must demonstrate that the claims do not “set out and circumscribe a particular area with a **reasonable** degree of precision and particularity.” *In re Moore*, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971). The purpose of the second paragraph of Section 112 is to basically insure an **adequate** notification of the metes and bounds of what is being claimed. *See In re Hammack*, 427 F.2d 1378, 1382, 166 USPQ 204, 208 (CCPA 1970).

The Examiner has rejected claims 28, 29 and 37 as unpatentable under 35 U.S.C. § 112, second paragraph as indefinite. According to the Examiner, “[i]t is not clear how much photosensitivity is sufficient photosensitivity and how much resolution is sufficient resolution.” (Examiner’s Answer, page 5).

We determine that the examiner has not met the initial burden by failing to present any reasons why one of ordinary skill in the art would not be appraised of the scope of the claims on appeal. The specification examples 32-56 describe compositions with properties which are representative of the claimed invention. Table 6 describes the resolution and photosensitivity for alkali-soluble resins having a

softening point greater than 150°C and a molecular weight between 3,000 to 8,000.

The resolution ranges from 0.25 : m to 0.6 : m and the photosensitivity ranges from 5 : C/cm² to 30 : C/cm² when using an electron beam light source and 80 mJ/cm² to 220 mJ/cm² when using a KrF Excimer laser light source. (Specification, pages 54-60).

For the foregoing reasons and those set forth in the Brief and Reply Brief, the rejections under 35 U.S.C. § 112, second paragraph, is reversed.

Rejection Under 35 U.S.C. § 112, First Paragraph

Appellants have failed to explain why the claims are believed to be separately patentable, therefore, we will treat all of the claims as standing or falling together with claim 36 as representative. See 37 CFR § 1.192(c)(7).

In rejecting claims 28, 29, 36 and 37 under the first paragraph of 35 U.S.C. § 112, the examiner states that the claims contain “subject matter which was not described in the specification.” (Examiner’s Answer, page 4.) The Examiner appears to assert that one skilled in the relevant art would not recognize that the applicants had possession of a chemical amplification photosensitive composition, comprising a polyvinylphenol resin having a softening point of at least 150°C and a weight average molecular weight which exceeds 8,000. Specifically, the Examiner asserts (the final Office action dated August 28, 1997, page 2):

Appeal No. 1998-2147
Application No. 08/247,356

Claims 28, 29, 36 and 37 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Contrary to applicant's assertions, a review of the specification and claims as originally filed did not reveal support for the following limitations recited in claims 36 and 37:

“and exceeds 8,000 only when the photosensitive composition containing the resin has sufficient photosensitivity and forms a resist pattern which has sufficient resolution.”

[Quotation original, page 2].

The Examiner's rejection appears to be based on the written description requirement of 35 U.S.C. § 112, first paragraph. The Examiner also does not believe the claims have an upper limit for the molecular weight because Appellants have not defined what constitutes “sufficient photosensitivity” and “sufficient resolution.” (Examiner's Answer, page 19, lines 15-21).

In order for a claim to satisfy the written description requirement, the original application must reasonably convey to those skilled in the relevant art that the applicants, as of the filing date of the application, had possession of the claimed invention. *In re Alton*, 76 F.3d 1168, 1172, 37 USPQ2d 1578, 1581 (Fed. Cir. 1996); *In re Kaslow*, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)).

However, the written description requirement does not require the applicants to describe exactly the subject matter claimed in the original application. Instead, the

description must clearly allow persons of ordinary skill in the art to recognize that the applicants invented what is claimed. *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989).

Appellants appear to rely on an implicit disclosure that one skilled in the relevant art would recognize that the applicants had possession of a chemical amplification photosensitive composition, comprising a polyvinylphenol resin having a softening point of at least 150°C and a weight average molecular weight which exceeds 8,000 only when specific conditions have been met. On page 19 of their principal brief, Appellants direct us to the specification which provides the following description:

If the alkali-soluble resin has an average molecular weight of less than 3000, it dissolves with an alkaline solution to excess in some cases. If it has an average molecular weight of more than 8000, the polymer chains of the resin may, in some cases, be crosslinked when the composition containing the resin is exposed to an ionizing radiation and then baked. In this case, the composition has an insufficient photosensitivity and cannot form a resist pattern which has sufficient resolution.
[page 19, lines 11-20.]

Appellants also assert all one has to do is consult Table 6 of the specification to arrive at an understanding meaning of “sufficient photosensitivity” and “sufficient resolution.” (Reply Brief, page 2, lines 13-16). Specifically, Appellants state:

[I]f a particular polyvinylphenol, having a molecular weight exceeding 8,000, is selected for the preparation of a specific photosensitive composition, it can only be selected if, once the composition based on the resin is applied on a substrate, it exhibits the photosensitive and resolution characteristics expected for a composition within the scope of the present invention. If the selected polyvinylphenol does not meet the stated characteristics of the invention, then the polyvinylphenol is outside the scope of the invention and cannot be used in the presently claimed photosensitive composition.

[Reply Brief, page 2, lines 16-26].

We determine that the specification does not indicate that polyvinylphenols whose molecular weight exceed 8,000 are suitable for use in chemical amplification photosensitive composition as long as they exhibit the same properties as a polyvinylphenol with a molecular weight within the range of 3,000 to 8,000. Page 19 of the specification appears to direct those skilled in the relevant art to the disadvantages of using an alkali-soluble resin having a weight average molecular weight which exceeds 8,000. Specifically, if the molecular weight exceeds 8,000, the chains of the polymer itself could be crosslinked when the composition is exposed to radiation and baked. (Specification, pages 19, lines 15-16). It follows then that the specification does not adequately describe a chemical amplification photosensitive composition, comprising a polyvinylphenol resin having a softening point of at least 150°C and a weight average molecular weight which exceeds 8,000. Therefore, the

rejection of appealed claims 28, 29, 36 and 37 under 35 U.S.C. § 112, first paragraph, is affirmed.

Rejections Under 35 U.S.C. § 102/§ 103

Claims 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Crivello.

Claims 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Nguyen-Kim.

Claims 29, 36 and 37 are rejected as unpatentable under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Elsaesser.

We consider next the examiner's rejection of claims 29, 36 and 37 under 35 U.S.C. § 102 as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Crivello, Nguyen-Kim or Elsaesser. The Examiner asserts the claimed subject matter is anticipated or obvious from Crivello, Nguyen-Kim and Elsaesser despite the references' failure to describe the claimed molecular weight and softening point of the polymer. The Examiner asserts these properties are inherently possessed by the polymers of the references. (See Examiner's Answer, pages 6 to 12). The Examiner states the "claims now do not have a upper limit for the molecular weight. The claimed weight range is encompassed by the prior art. It is apparently inherent that at the upper

end of the prior art molecular weight range the Tg of the prior art resins will meet applicants' claim limitations." (Examiner's Answer, page 7, lines 6-11; page 9, line 19 to page 10, line 2; and page 12, lines 7-12).

When relying upon the theory of *inherency*, the Examiner has the initial burden of establishing a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *See Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int. 1990). The Examiner is apparently relying on the theory that the higher the molecular weight the higher the softening point. This theory does not speak to the photosensitivity and resolution of these "high molecular weight" polymers. The Examiner does not provide a sufficient factual basis to demonstrate that the "high molecular weight" polymer described in Crivello, Nguyen-Kim or Elsaesser necessarily possesses a Tg greater than 150°C and the photosensitivity and resolution required by the claims. We have not been directed to specific portions of Crivello, Nguyen-Kim or Elsaesser which establish that their high molecular weight polymers possess the recited photosensitivity and resolution characteristics of the claims. It is possible that Crivello's, Nguyen-Kim's or Elsaesser's high molecular weight polymers may possess a Tg greater than 150°C and the photosensitivity and resolution

characteristics required by the claims. However, *inherency* cannot be established by probabilities or possibilities. *See In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981). As stated in *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (quoting from *In re Oelrich*, 666 F.2d at 581, 212 USPQ at 326), “[t]he mere fact that a certain thing **may** result from a given set of circumstances is not sufficient [to establish inherency]” (emphasis in original). Under these circumstance, we cannot conclude that the examiner has met the minimum threshold of establishing inherency under 35 U.S.C. § 102 or obviousness under 35 U.S.C. § 103. Therefore, the rejection of claims 29, 36 and 37 under § 102 and § 103 are reversed.

Rejection Under 35 U.S.C. § 103

Claim 28 is rejected as unpatentable under 35 U.S.C. § 103 over Crivello, Nguyen-Kim, or Elsaesser in view of Uenishi ‘389 or Uenishi’ 582.

It is well established that the examiner has the initial burden under § 103 to establish a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). To that end, the examiner must show that some objective teaching or suggestion in the applied prior art, or knowledge generally

available in the art would have led one of ordinary skill in the art to arrive at the claimed invention. *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996).

According to the Examiner, Uenishi '389 and '582 teach photosensitive alkali-soluble novolak composition comprising the claimed acid-decomposable compound. The Examiner urges Crivello, Nguyen-Kim and Elsaesser teach the claimed chemical amplification photosensitive composition except for specifically teaching the claimed acid-decomposable compound. The Examiner concludes "[o]ne of ordinary skill in the art would have been motivated to make this substitution because of the teaching of Uenishi et al. [sic, '389 or '582] that these compounds provide resists which are capable of forming a pattern with vertical side walls, have broad development latitude, and provide resist images with excellent heat resistance." (Examiner's Answer, page 14, third paragraph).

We disagree with the Examiner's factual basis underlying this rationale to establish *prima facie* obviousness. The light sensitive material of Uenishi '389 and '582 is sensitive to actinic radiation because of the reaction of a novolak resin with at least one 1,2-quinone diazide group. ('389, column 2 lines 11-31; '582, column 4, lines 50-55). Uenishi '389 and '582 do not describe a component which generates an

acid when exposed to activating radiation. The decomposable compounds of Crivello, Nguyen-Kim and Elsaesser contain groups which are cleaved by acid. Uenishi's dissolution inhibitors are fundamentally different because they form an alkali-soluble substance when subjected to radiation. Consequently, one of ordinary skill in the art would not have been motivated to substitute the dissolution inhibitors of Uenishi '389 and '582 for the decomposable compound of Crivello, Nguyen-Kim or Elsaesser.

In the absence of sufficient factual evidence or scientific rationale on the part of the Examiner to establish why and how a skilled artisan would have arrived at the subject matter of claim 28 from the applied references, we find that the Examiner has failed to meet the initial burden of establishing the *prima facie* obviousness of the claimed subject matter. Accordingly, we are constrained to reverse the Examiner's rejection of claim 28.

CONCLUSION

The rejection of claims 28, 29 and 37 as unpatentable under 35 U.S.C. § 112, second paragraph is reversed.

The rejection of claims 28, 29, 36 and 37 as unpatentable under 35 U.S.C. § 112, first paragraph is affirmed.

Appeal No. 1998-2147
Application No. 08/247,356

The rejection of claims 29, 36 and 37 as unpatentable under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Crivello is reversed.

The rejection of claims 29, 36 and 37 as unpatentable under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Nguyen-Kim is reversed.

The rejection of claims 29, 36 and 37 as unpatentable under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over Elsaesser is reversed.

The rejection of claim 28 as unpatentable under 35 U.S.C. § 103(a) over Crivello, Nguyen-Kim, or Elsaesser in view of Uenishi '389 or Uenishi' 582 is reversed.

Appeal No. 1998-2147
Application No. 08/247,356

Time for taking action

No time period for taking any subsequent action in connection with this appeal
may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

CHUNG K. PAK
Administrative Patent Judge

THOMAS A. WALTZ
Administrative Patent Judge

JEFFREY T. SMITH
Administrative Patent Judge

)
)
)
)
)
) BOARD OF PATENT
) APPEALS AND
) INTERFERENCES
)
)
)
)
)

JTS/kis
OBLON, SPIVAK, MCCLELLAND

Appeal No. 1998-2147
Application No. 08/247,356

MAIER & NEUSTADT
FOURTH FLOOR
1755 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202